# Land surface temperature and vegetation index as a proxy to microclimate

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**Abstract**

The effect of global climate change on the temperature of urban areas has become more pronounced in the past couple decades, impacting population and quality of life. The United Nations (UN), the National Aeronautics and Space Administration (NASA) and the Intergovernmental Panel on Climate Change (IPCC) have emphasized the impact of urban structures on microclimatic. A better understanding of these effects is important to formulate effective strategies that would contribute to address the impacts of increased urban growth. Here we address a case study of the Vila Rodrigues neighborhood, located in Passo Fundo City in southern Brazil to analyze the variations of emissivity, temperature and vegetation of the terrestrial surface, with influence of buildings. We employ Landsat satellite images, and unpublished data provided by the NASA, interpolated and classified in the QGIS software, using Bands 4, 5 and 10, converted to Gray Level (NC). This procedure allowed the spectral radiance of the reflectance temperature to be obtained. The Land Surface Temperature (LST) and Normalized Difference Vegetation Index (NDVI) were used, with correction of emissivity and spectral error, in the identification of the surface temperature of different areas in the Villa Rodrigues. The results showed a total variation of 3.86ºC among the sampled points, which is increased by the difference in significance of the thermal balance in urban areas under open sky with buildings. We suggest that green areas and parks with abundant vegetative cover and the application of new building materials in future constructions would help to improve the urban climate, and such regulation of the local temperature on global scale is an effective step towards addressing the adverse effects from climate change.

**Keywords**

Engineering, Microclimate, Remote Sensing, Air Temperature, Global environment